

Claims

What is claimed is:

1. A method for measuring high-energy radiation, comprising:
 - applying a voltage pulse to electrodes in an ion chamber filled with a gas capable of forming charged ions by the high-energy radiation;
 - measuring an ion current signal related to ion currents induced by the voltage pulse; and
 - determining a magnitude of the high-energy radiation based on the ion current signal.
2. The method of claim 1, further comprising measuring a leakage current signal, wherein the determining the magnitude of the high-energy radiation comprises subtracting the leakage current signal from the ion current signal.
3. The method of claim 2, wherein the measuring the leakage current signal is performed after the voltage pulse is turned off.
4. The method of claim 2, further comprising determining a gain.
5. The method of claim 4, wherein the determining the gain comprises applying a ramping current to the electrodes in the ion chamber.
6. The method of claim 4, wherein the gain is used to adjust a magnitude of the ion current signal or a magnitude of the leakage current signal.
7. The method of claim 6, wherein the subtracting the leakage current signal from the ion current signal uses a magnitude-adjusted ion current signal or a magnitude-adjusted leakage current signal.

8. The method of claim 1, further comprising determining a gain, wherein the determining the magnitude of the high-energy radiation is based on the ion current signal and the gain.
9. The method of claim 8, wherein the determining the gain comprises applying a ramping current to the electrodes.
10. A system for measuring high-energy radiation, comprising:
 - an ion chamber having an ionizable material that can be ionized by the high-energy radiation;
 - two electrodes disposed in the ion chamber; and
 - a circuit connected to the two electrodes, wherein the circuit is configured to provide a voltage pulse to the two electrodes and to measure an electrical signal across the two electrodes.
11. The system of claim 10, wherein the ionizable material comprises one selected from helium-3, boron trifluoride, lithium-6, uranium-233, uranium-235, and plutonium-239.
12. The system of claim 10, further comprising a target chamber comprising a hydrogenous material, wherein the target chamber is disposed proximate the ion chamber, and wherein the high-energy radiation comprises neutron radiation.